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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/063,089	03/18/2002	Ji-Cheng Zhao	RD-29604	6423

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EXAMINER

MCNEIL, JENNIFER C

ART UNIT PAPER NUMBER

1775

DATE MAILED: 05/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/063,089	Applicant(s) ZHAO ET AL.	
	Examiner Jennifer C McNeil	Art Unit 1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) See Continuation Sheet is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,8,9,15-23,26,28-31,33-35,40-43,45,47-49,51,52,56-61 and 63-71 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Continuation of Disposition of Claims: Claims pending in the application are 1,3-6,9,15-23,26,28-31,33-35,40-43,45,47-49,51,52,56-61 and 63-71.

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DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3-6, 9, 15-22, 26, 28-31, 34, 40-42, 45, 47-49, 51, and 56-60 are rejected under 35 U.S.C. 102(e) as being anticipated by Darolia (US 6,558,813). Darolia teaches a protected article comprising a metal substrate and a coating system thereon. The coating system includes an iridium-containing barrier layer. The iridium layer comprises about 70-90 wt% Ir. The iridium layer may be 5-50 microns thick. An outer coating of a thermal barrier is also provided. The thermal barrier layer comprises YSZ and is 0.003-0.010 inches thick. A layer of alumina is present between the iridium-containing barrier layer and the substrate. Alumina is a barrier to aluminum diffusion, and is considered a diffusion barrier layer. The alumina layer may have a thickness of about 5 microns.

Claims 1, 3, 9, 15-20, 26, 28, 34, 35, 40, 45, 47, 48, 51, and 56-60 are rejected under 35 U.S.C. 102(e) as being anticipated by Nagaraj et al (US 6,627,323). Nagaraj teaches a thermal barrier coating comprising a superalloy substrate for use as a turbine engine component, and a coating comprising a platinum-group metal. The noble metal layer may be Pt, Ru, Rh, Pd, Os, or Ir, and may have a thickness of 0.5-5 microns. An outer layer of alumina may be provided and is considered a thermal barrier layer. An alumina layer may be provided between the noble metal layer and the substrate. This alumina layer may have a thickness of about 0.5-50 microns and is considered a diffusion barrier layer.

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Claims 63, 64, 69, and 70 are rejected under 35 U.S.C. 102(e) as being anticipated by Jackson et al (US 6,609,894). Jackson teaches a turbine airfoil including a wall (substrate) where a portion of the wall comprises at least about 65 at% of Rh, Pt, Pd and mixtures thereof, and nickel superalloy. A thermal barrier coating of ceramic may be deposited thereon.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8, 23, 33, 43, 52, and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Darolia (US 6,558,813) in view of Spitsberg et al (US 6,306,524). Darolia '813 teaches a protective coating of iridium as discussed above and includes a bond coat of MCrAlX therebetween, wherein the X may be Rh, or Pt. Darolia '813 does not give additional examples of MCrAlX compositions. Spitsberg teaches a coating for a turbine engine component including a bond coat or diffusion barrier layer comprising MCrAlY layer, wherein the Y may be substituted with Ru. Spitsberg also teaches that alloys with Ru are expected to form excellent diffusion barrier layers between a nickel-based substrate and aluminum containing outer layers. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the coating of Darolia '813 with a diffusion barrier like that of Spitsberg as it is shown to form an excellent diffusion barrier layer and is tightly adherent to the underlying superalloy substrate.

Claims 8, 21, 22, 33-35, 41, 42, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagaraj et al (US 6,627,323) in view of Spitsberg et al (US 6,306,524). Nagaraj '323 teaches a coating system as discussed above, including a MCrAlX layer but does not give additional examples of MCrAlX compositions. Spitsberg teaches a coating for a turbine engine component including a bond coat or diffusion barrier layer comprising MCrAlY layer, wherein the Y may be substituted with Ru. Spitsberg also teaches that alloys with Ru are expected to form excellent diffusion barrier layers between a nickel-based substrate and aluminum containing outer layers. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the coating of Nagaraj '323 with a diffusion barrier like that of Spitsberg as it is shown to form an excellent diffusion barrier layer and is tightly adherent to the underlying superalloy substrate.

Claims 65-68, and 71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson et al (US 6,609,894) in view of Darolia (US 6,558,813). Jackson teaches a turbine airfoil comprising a substrate having a first material of a nickel superalloy, and a second material of at least about 65 at% Pt Rh, or Pd and nickel superalloy. Jackson teaches that the airfoil substrate is coated with at least one of a ceramic thermal barrier coating. Jackson does not specify the ceramic composition or the thickness of the coating. Darolia teaches a turbine airfoil with a superalloy substrate and a thermal barrier coating of YSZ at a thickness of 0.003-0.010 inches thick. YSZ is a common material in the art of turbine blades, and is used to provide thermal resistance to airfoil substrates. It would have been obvious to one of ordinary skill in the art at the time of the invention to use YSZ as the coating material for the thermal barrier of Jackson, as it is taught by Darolia to provide thermal resistance for turbine blades, and is well known in the art of turbines to provide thermal protection.

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Response to Arguments

Applicant's amendment has overcome the rejections over Przybyszewski, Nagaraj '263, and Darolia '250.

Applicant's arguments filed March 11, 2004 have been fully considered but they are not persuasive.

Regarding Darolia '813, applicant argues that the diffusion barrier of the instant claims cannot be interpreted to be the equivalent of a bond coat. Applicant relies on a description in the instant specification. The instant claims refer to a diffusion barrier layer, but do not refer to what the layer is a barrier to, therefore arguments are not commensurate. Any layer that prevents diffusion of an element or compound may be considered a barrier layer. Furthermore, the barrier layer is not quantified as to how much it prevents from diffusion. The bond coat of Darolia would provide at least some barrier to diffusion of elements from the substrate to the outer coatings. Furthermore, the alumina layer of Darolia '813 is a diffusion barrier layer that prevents diffusion of aluminum (please refer to Rigney '167 for this property). Regarding the combination with Spitsberg, the bond coat of Spitsberg teaches advantageous characteristics that would be obvious to provide to the article of Darolia '813.

Regarding Nagaraj '323, applicant again argues that the bond coat is not equivalent to the claimed diffusion barrier layer. As stated above, the claims do not reflect an aluminum diffusion barrier layer, and the specification does not clearly define the layer as such. Furthermore, the inner alumina layer of Nagaraj is a diffusion barrier layer that prevents diffusion of aluminum. Applicant also argues that the outer alumina layer provided on the article is not a thermal barrier layer. A layer of a ceramic would provide at least some added resistance to thermal exposure, and is therefore considered a TBC.

Regarding claims 63-71, a newly cited reference (Jackson) is relied upon.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer C McNeil whose telephone number is 571-272-1540. The examiner can normally be reached on 9AM-6PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jennifer McNeil
Primary Examiner
Art Unit 1775